Processing of a new detailed Bouguer anomaly map in the Mons area, SW-Belgium, looking for deep-seated anomalies

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In the Mons area, a new detailed Bouguer anomaly map has been computed following new data acquisition in the scope of the MoreGeo 2019-2022 survey (EDRF funding) [Campeol et al., 2024]. This new dataset consist in 13,000 measurements in 4,200 stations spread over an area of 820 km² processed using open-source Python libraries and integrated to the gravity databases of Belgium [Verbeurgt et al., 2019] and France [Martelet & al 2002]. The anomaly map, based on a reprocessed dataset of 69,000 measurements, covers about 5,000 km² on a regular grid of 50 m resolution.

Particular attention has been paid to topographical correction using prisms gravity method [Harmonica 2023]. However, in the Mons area, due to the presence of the cretaceous Mons Basin and the residual tertiary relief, varying correction densities should be applied. In order to tackle this difficulty, a two step approach has been adopted. First, positive and negative anomalies of the Bouguer map are compared with the extent and thickness of the meso-cenozoic deposits of the Mons Basin unit. Second, the effect of this sedimentary basin on the gravity field is modelled, compared with the Bouguer map. Finally, a gravity anomaly map where the effect of the meso-cenozoic deposits of the Mons Basin unit are subtracted in order to highlight the deeper anomalies is computed.

This new map paves the way for the search of density contrasts in the carboniferous limestone geothermal reservoir that could distinguish karstified and brecciated limestones from massive anhydrite layers.

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